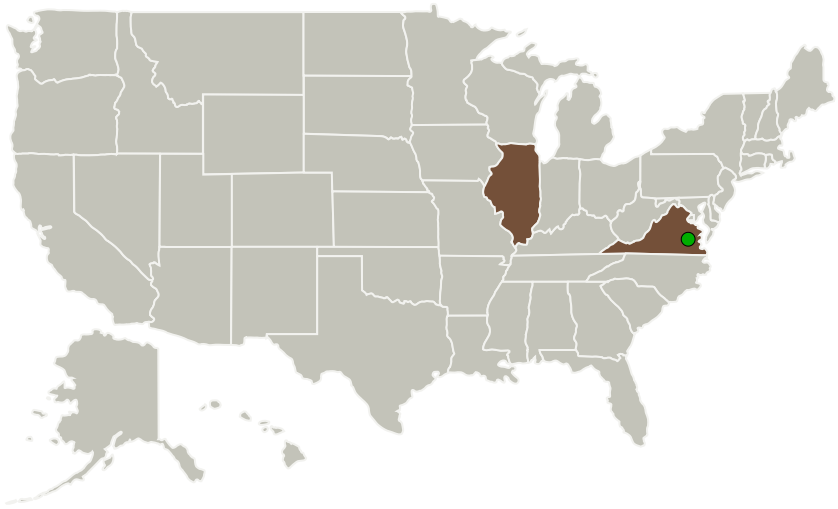
Solar Powered Long Endurance Small UAS, Phase I

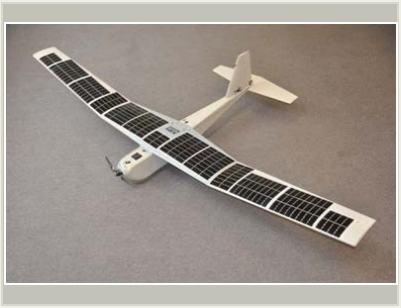
Completed Technology Project (2016 - 2016)

Project Introduction

MicroLink Devices proposes to integrate its high-efficiency, lightweight, and flexible solar sheet technology to a small unmanned aircraft system (UAS) that will demonstrate a pathway to long endurance flights for several weeks. This will be a breakthrough technology that will enhance the performance and utility of NASA's Airborne Science fleet UAS. In previous work, MicroLink has demonstrated that its unique solar sheet technology enables significant extension of flight for small battery-operated UAS platforms. Further refinement of this solar technology and working in close collaboration with the small UAS manufacturer to optimize the UAS platform for long endurance flight will allow flight times even greater than first demonstrated in prototype experiments. This project will leverage MicroLink's recent advances in inverted metamorphic (IMM) multi-junction (ELO) solar cell technology. The unique nature of the ELO solar cells has given rise to new opportunities for solar cell packaging: the inherent physical flexibility of these high efficiency solar cells can be exploited in the manufacture of a new generation of photovoltaic (PV) blankets that are lightweight, flexible, and modular. Recent work has developed a solar cell device and solar sheet encapsulation process that is almost 50% the weight of earlier solar cells and sheets first used on the small UAS demonstrations while still maintaining the high-efficiency of earlier devices. The result resulting modular high-efficiency solar sheets are an ideal candidate and solution for maximum power generation in a limited area and within weight constraints such as air vehicle applications.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
MicroLink Devices, Inc.	Lead Organization	Industry Minority-Owned Business	Niles, Illinois
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Illinois	Virginia

Project Transitions

June 2016: Project Start

December 2016: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139824)*

Images

Briefing Chart Image
Solar Powered Long Endurance Small UAS, Phase I
(https://techport.nasa.gov/image/126413)

Final Summary Chart Image
Solar Powered Long Endurance Small UAS, Phase I Project Image
(https://techport.nasa.gov/image/127657)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
MicroLink Devices, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

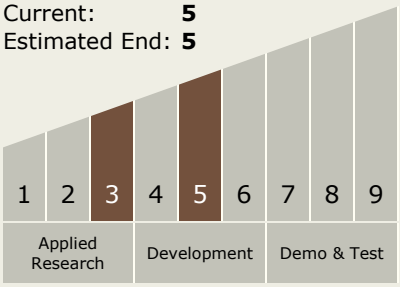
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Ray Chan

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



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Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.1 Power Generation and Energy Conversion
    - TX03.1.1 Photovoltaic

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System